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TEN DYNAMIC YEARS



A Report on the
Hawaiian Sugar Industry

HSPA

HAWAIIAN SUGAR PLANTERS' ASSOCIATION



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INTRODUCTION

Hawaii's sugar industry has just completed a decade of dramatic development. The period from 1947 through 1957 has witnessed a notable progression of changes and achievements as the sugar companies of Hawaii have altered their methods and operating practices, adapting to new techniques, new machines and new materials made available to them through scientific advance. There have been changes, too, in the area of human relations, and between business and government, at the local and national level, and shifts in competition and consumer buying habits affecting the marketing of Hawaii's basic industrial product. When all of these inter-related developments of the decade are seen together they form an impressive record of efforts made by the industry to keep pace with the challenge of changing times and conditions.

It seemed, therefore, that the 1957 report of the Hawaiian Sugar Planters' Association would provide opportunity for timely summary of the more significant developments in this eventful 10-year period.

Because most of the problems confronting the industry at the beginning of the decade resulted from World War II shortages and restrictions, a background review of the war years has been included.

The material on the following pages has been arranged under these general headings:

An Industry at War—prewar defense preparations . . . the shock of Pearl Harbor . . . marshalling manpower and materials for the war effort.

The People in Sugar—changing patterns in human relations . . . the role of the union . . . rising living standards . . . new directions for management.

Better Tools for Better Jobs—the march of mechanization . . . trains yield to trucks . . . the airplane bests the hoe.

Science in the Fields—more tons from better cane . . . chemical warfare against weed and bug . . . the good earth made better.

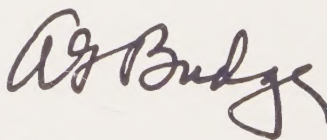
Hawaii's Sugar Goes to Market—new products and packages . . . consumer habits change . . . the rise of competition.

Dollars from Sugar—sources of capital . . . money requirements . . . higher costs . . . compliance payments . . . pressure on profits.

The Washington Scene—sugar under the law . . . federal controls . . . quotas and competition . . . cooperation for protection.

The Sum and Substance—meanings from the decade.

In assembling and organizing the data for chapters to follow it has been necessary to draw upon the assistance of a number of individuals. Among the principal contributors were Dr. Leonard Bayer who supplied material for the chapters on mechanization and agricultural science; Donald Maclean, the information on marketing; and Slator Miller, data from the Washington office. Many others have assisted in organizing and editing the material to provide this record of 10 eventful and meaningful years in the history of the Hawaiian sugar industry.



President
Hawaiian Sugar Planters' Association 1957

YEARS OF CHALLENGE AND CHANGE

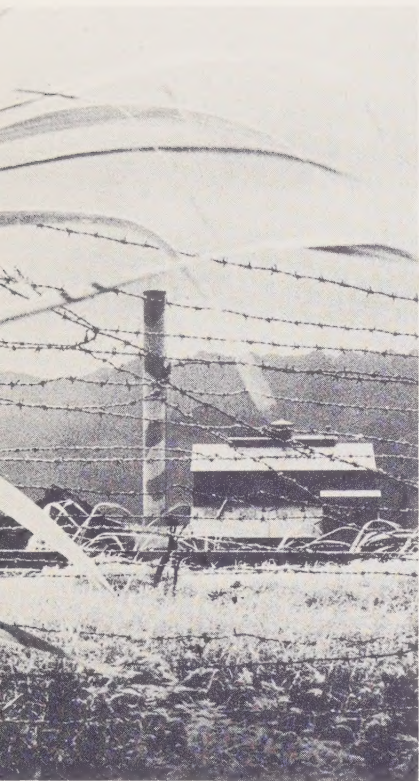
AN INDUSTRY AT WAR

There are reminders. A chipped pill box with vacant gun slots stares over a field of sprouting cane. In the brush on the hillside in back of the field there's a rotting barracks, a tangle of rusting barbed wire, a slab of concrete and steel. Lantana and haole koa have healed the deep cut where the bigger guns nuzzled out over the plantation village. Around the rim of Pearl Harbor long gray supply sheds, quonset huts, military housing units stand now where cane grew.

These are a few of the many remaining reminders of grim war years when Hawaii's major industry recoiled from attack and then marshalled men, materials and machines to help the community and nation fight on to victory.

The war record of the industry actually began almost three years before the United States was actively engaged in the conflict. It is a record of pre-war preparation and planning in sharp contrast with the general impression that the Pearl Harbor attack caught the islands completely asleep. For almost three years before the bombs fell the industry, individual companies and personnel had been assuming active and important roles in civilian defense plans which were effectively executed when tragic necessity demanded action.

Where before there was only the quiet rustle of growing sugar cane, gun positions were established, communication lines were installed, and surveys were made for airfields and other installations. There were camouflage tests in cane lands. Often there was blanket permission for the Army to hold maneuvers, using all plantation roads and lands, water and any other facilities needed.



A camouflaged stack,
symbol of an industry at war.

Long prior to the war the Hawaiian Sugar Planters' Association helped prepare an emergency food program. Originally, the program involved study to determine which food crops could be grown with economic success in Hawaii to supplement pineapple and sugar. Later, pre-war uncertainties shifted emphasis to subsistence plans for food crops which would enable the Islands to survive under siege conditions or prolonged interruption of normal supply channels.

Sugar plantation personnel assumed key roles in organization of civilian defense. In 1940, a former plantation manager was named as civilian defense coordinator. Plans were developed envisioning almost complete mobilization of plantation facilities and equipment in the event of an emergency. Power plants, fire-fighting equipment, trucks, cranes and completely staffed hospitals—all were plotted into the plans.

QUICKLY RALLIED

No one, neither the military leaders nor civilians responsible for defense preparations, had adequately foreseen the crushing enormity of the burdens which would result from the attack itself. But after Hawaii's military and civilian defense organization began dazedly piecing itself together following the initial shock of the blitz, the community quickly rallied and surefootedly followed emergency measures made familiar by prewar practice.

In rural communities members of a provisional police guard, composed of some 1,500 plantation employees, assumed preassigned stations following the attack on Pearl Harbor. Their service relieved military personnel for more important duty at critical potential combat stations. Food crop plans developed originally by the sugar industry's committee formed the basis of an emergency subsistence program.

Other pre-war defense committees had made plans to meet problems involving transportation, evacuation, medical aid, air raid warning, fire fighting, power and light facilities, water supply and communications. Preparations made by these committees were the basis for measures taken following the attack.

MILL STRAFED

When the enemy struck, the plantations in the vicinity of Pearl Harbor felt the impact of war more acutely than those in the more remote districts. Strafing planes stitched a pattern of machine gun fire across mill roofs. Some canefields were fired by exploding shells or crashing aircraft. Plantation hospitals immediately began receiving casualties, military and civilian. Trucks, cranes and tractors were dispatched with plantation personnel to Pearl Harbor, Ewa Marine Air Station, Hickam Field, Wheeler Field and other Army and Navy installations.

The first and immediate task was that of mobilizing all available men and machines to help repair damaged bases. Then came the longer, bigger job of building up the island installations in anticipation of possible further attack.

The urgent necessity of building many new airbases on Oahu placed further heavy demands on plantation men and machines. On other islands sugar company employees provided virtually the only source of labor for military construction projects during the early emergency period.

Sugar company power plants supplied supplementary current to help meet the heavy demand for electricity. To disperse repair work while their own damaged facilities were being reconditioned, the Army and Navy used plantation shops to service tanks and to fabricate tank barriers, gun mounts, storage tanks and other armament units.

At one sugar company 37 per cent of the total man-hours worked by machine shop crews between January 1 and September 30, 1942, was for the Army. More than a half-million man-hours of plantation labor were supplied to the Army Engineers alone during the war period. More than a million sugar sacks were requisitioned for sand bags. Some plantations cut substantial acreage of cane to clear open fields of fire so that vision from adjacent gun positions covering possible enemy landing areas would be unobstructed.

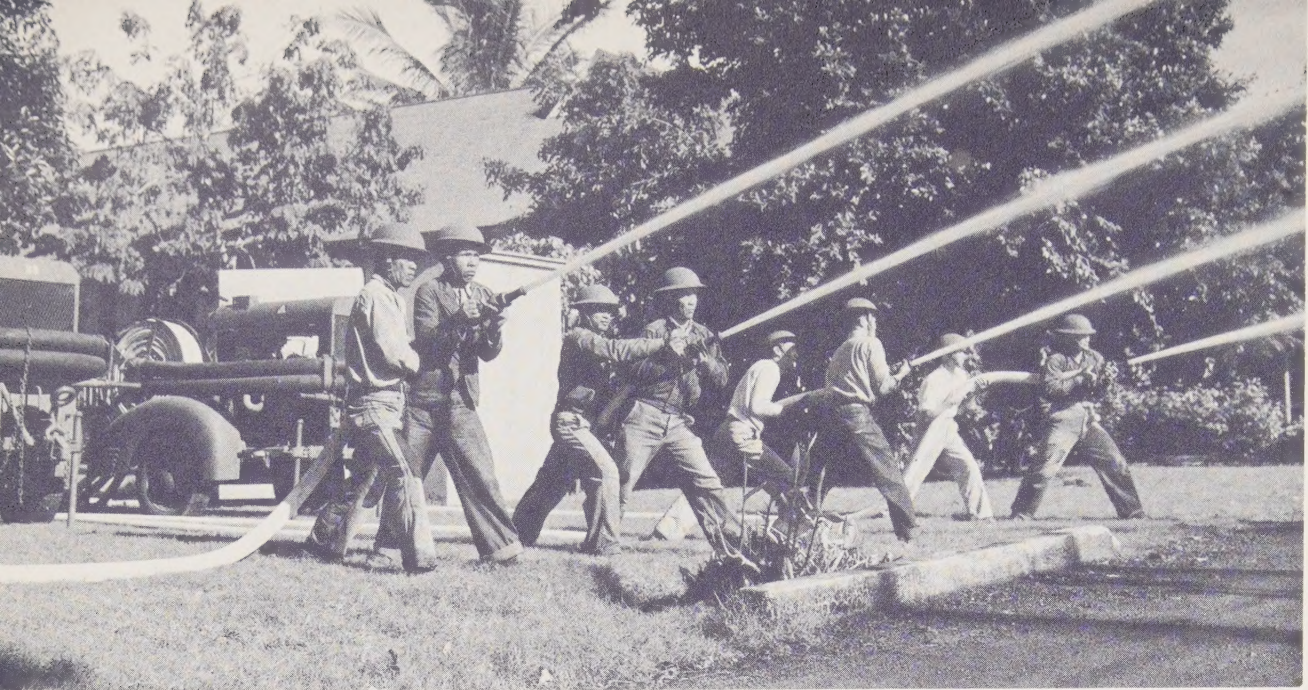
VOLUNTEERS FOR COMBAT

The labor force which numbered 30,646 in 1941, dropped by a third to 20,806 by 1945 as many of the young men from plantation communities volunteered for combat assignments or shifted to other wartime employment. The heroic performance of Hawaii's famed 100th Infantry Battalion and 442nd Regimental Combat Team was reflected in the long star-studded service records featured in the sugar company reports during the war period; long lists of names sprinkled with stars denoting employees killed in action.

Despite many handicaps, manpower shortages, reduced acreage, inadequate maintenance of fields and facilities, lack of materials and supplies, the companies managed somehow to continue producing sugar with total tonnage varying from a high of 947,190 tons in 1941 to 821,216 in 1945.

A sugar worker and a GI,
partners in the conflict.





Plantation employees training for civilian defense.

Peace came in 1945 and with it, the hope of an early return to the prewar pattern of operations. But even then there were those who sensed that the war had wrought many changes which would have lasting impact on Hawaii's basic industry.

At a dinner during the HSPA annual meeting in December, 1945, Philip E. Spalding, then HSPA President, had this to say, in part: "We are now emerging from one of the great challenges to the industry. . . . Hawaii took the first blow and Hawaii was the spearhead for the offensive warfare that meant victory.

"We are proud of the record established by this association and all of its members in the contributions which were made toward winning the war . . . to my knowledge, never once did any member fail in performing the tasks which were put upon him. These tasks varied from the manufacture of artillery mounts, to the transportation of troops; the production of other feed crops; the creating of a home army of nearly 15,000 men; to which was added their co-operation with all the various civilian agencies which sprang up as a result of the war.

"Now we are at the beginning of another era. The work that lies ahead is as serious a challenge as any that we have met before."

Mr. Spalding also said of the future:

"Marginal producers and marginal lands will have to be abandoned. . . . It is certain that those plantations which cannot achieve mechanization will have great difficulty in operating successfully.

"I do not begrudge the payment of good wages to labor. I rejoice that we are paying the best farm wages in the world, but labor must realize that the plantations, in order to continue their jobs, must secure enough money for their products to meet their payrolls and other expenses and to pay a fair return on the capital which created the properties.

"This means that as wages rise the productivity of the individual worker must increase. This increase can be accomplished only by providing him with tools with which to work. The end result will be far fewer employees on each plantation than in the years that have passed.

"Eventually, labor will realize the facts of the situation. I believe that the next few years are going to present some of the hardest problems which have ever confronted the sugar producers of Hawaii. During the past 50 years, 41 separate producing companies have gone out of existence. During these next few years other companies will be forced to abandon the struggle but the majority will continue and will maintain sugar production as the economic backbone of these Islands."

MEN NEEDED

Peace and the rebuilding of the industry did not come simultaneously—nor easily. Shortages of materials and supplies continued. Desperately needed were more men for the labor force. For men, the sugar industry turned to the Philippines.

The HSPA was authorized to bring 6,000 workers from the Philippines. A recruitment center was set up in Vigan, Ilocos Sur. Some 600,000 meals were provided to applicants and their families. In 1946, 6,000 men and 1,361 wives and children came to Hawaii. The men came on the S.S. Maunawili, which made four trips from the Philippines to Hawaii in the first half of the year. The women arrived mostly on two trips of the Marine Falcon in May and June, although some came with the men on the last trip of the Maunawili.

New recruits from the Philippines
arriving on the Maunawili.



Assignment of the new recruits, training them, helping them adjust to their new environment posed many problems. At the same time a new crisis was developing in labor-management relations.

Union efforts to organize Hawaii's sugar workers had begun in the 30's but not much progress had been made when war intervened; martial law and rigid wartime controls applied to labor as well as all other aspects of life in the islands. By 1944 organizing efforts were renewed and resulted in the first industry-wide contract in July, 1945.

The settlement, however, was on the basis of a one-year contract and it did not effectively remove the tensions which had been building up to an explosive level as a result of the union's aggressive and militant organizing drive.

When the contract expired August 31, 1946, without a new agreement the employees struck, demanding higher wages than the companies were prepared to pay at that time, joint company-union administration of perquisites, a 40-hour week and the union shop. The strike lasted from September 1 to November 19, 1946, with the result that sugar production that year dropped to 680,073 tons, the lowest figure in two decades.

The effect of the strike varied from plantation to plantation. For some it caused serious crop losses, damage to fields and had a generally disruptive impact which was to be reflected in operations and earning for several subsequent crop cycles.

The settlement did, however, eliminate the long-established perquisite system and set a new pattern in labor-management relations which will be discussed in another chapter of this report.

Thus the industry moved into 1947, the first normal post-war year and the beginning of what was to be an epochal decade in the history of sugar production in Hawaii.



Mass picketing during the 1946 sugar strike.



THE PEOPLE IN SUGAR

Energies which were either absorbed in the war effort or pent up by necessary restrictions imposed by the place of Hawaii in the war were rapidly released in the years that immediately followed.

Throughout the nation the war had introduced stringencies and impeded progress, but in no other American community had the controls and pressures been as severe as in Hawaii.

Wages were relatively frozen for three years. Appliances, automobiles and other luxuries had not been available. Housing was scarce, much of it in a state of disrepair because of long standing material and labor shortages.

Plantation employees as well as others wished these things to be corrected as soon as possible. Attitudes reflected a new perspective resulting from the wartime experience. The war had broadened and sharpened the outlook of many employees, a large number of whom had served in the Armed Forces overseas. Veterans of the heroic 100th Infantry Battalion and 442nd Regimental Combat Team returned with increased self-assurance.

Desire for improvement and change became evident in new political awareness and participation in community affairs where there was opportunity for self expression and status. The climate was right for the growing reliance of the rank and file on labor organizations.

NEW SECURITY

Many protections were formalized in the collective bargaining agreement of 1946 in such a way as to grant new, or seemingly new, securities. Grievance procedures provided a channel for hearing complaints. Provisions for seniority, rate protection, and other working conditions stated employee rights in specific terms. The agreement eliminated the old perquisite system under which the companies provided housing, medical care and domestic utilities. Paternalism in the sugar industry had served its purpose and was past.

However, there were some uncertainties and causes of insecurity. Mechanization or change in type of equipment being used was rapidly on its way. Many jobs were to be outmoded. The number of employees required to operate the plantation was to decline. New skills required by mechanization or new equipment had to be mastered; new tools were introduced. Inevitably there was competition for the new jobs, for opportunities to advance into the management group and competition for the relatively few opportunities to assume places of leadership in the union.

MANAGEMENT NEEDS

If the desire of individual employees had suffered some inevitable repressions during the war, the same may be said to be true of the plantation companies. Machinery and equipment had been kept in operation long beyond normal life. Talent had not been available to develop, test and install new methods. There was a need for rapid re-equipping both in the mills and in the fields, and for the staffing and development of the management organization to meet technical and human relations problems of the industry. Management had to adapt people to a new organization structure, to new managerial requirements, to new tools and new methods. Recognizing that labor must be dealt with as a group rather than individually, there was a requirement to learn to manage under the new conditions without the flexibility of less formalized methods. At the same time there was a recognition of the need to retain for management the right to control management functions. The plantation managements also had to learn to meet the security requirements of the new militant union.



A repatriating sugar worker.

By 1957 the employee population in the sugar industry was down to a total of 17,000, compared with 27,300 in 1947—a drop of over 35 per cent. This reduction had been accomplished with few layoffs, with a minimum of union-management friction. It resulted primarily from normal turn-over, retirement, and to some extent,

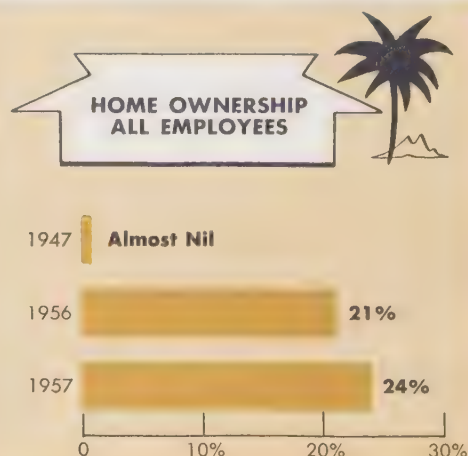
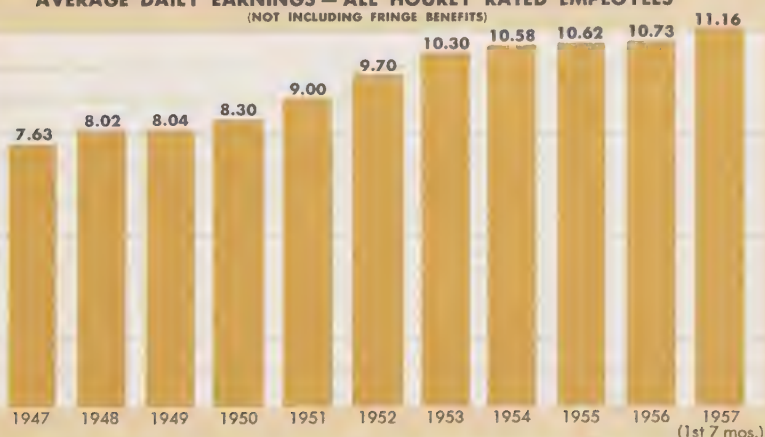
through repatriation fostered by contractual provisions which gave special benefits to employees who voluntarily returned to their homeland.

Other statistics reflect the trend during this 10-year period. Approximately 24 per cent of the employees owned their own homes by 1957, compared with almost no homeowners in 1947. The proportion of non-citizens had dropped by some 20 per cent. The adaptability of plantation people and development of higher levels of skill are reflected in figures showing that by 1957 only 19 per cent of the employees were in the lower labor grades as compared with 46 per cent 10 years prior. The daily cash wage by mid-1957 was up to \$11.10 and was augmented by fringe benefits with an average daily value of about \$3.60.

CONTRACT TERMS

The 1946 labor contract was a relatively simple document. Its history over 10 years has been one of expansion, both into new areas and in the detail of many of its provisions. Two examples may illustrate both the character of the changes and the elements which have withstood change. The agreement in force in 1947 granted recognition to the union in the preamble, by reason of association of employees with the union and by reason of prior recognition of the union by the companies. The 1956 agreement had in it a recognition and union security section. The union was recognized again as the sole and exclusive bargaining representative, but in addition its functions and grievance handling procedures were detailed. Other sections of the contract enhanced union security through provision for automatic coverage of new operations under certain circumstances and through agreement that work would not be assigned to contractors whose basic rates of wages, etc., were less favorable than those set forth. The finances of the union were, in effect, assured through the non-revokable dues deduction provision.

AVERAGE DAILY EARNINGS — ALL HOURLY RATED EMPLOYEES
(NOT INCLUDING FRINGE BENEFITS)





Negotiating a new contract.

The 1946 negotiation which determined the contract conditions of 1947 had as one of its demands the granting of the union shop and as another demand, the extension of union coverage to include at least first-line supervisors. Both of these proposals have been bargained intermittently over the 10 years. On neither of them has any serious consideration been given by management to breaching its position of principle. Similar positions have been taken and successfully negotiated with relation to other critical clauses in an effort to develop a working relationship which provides security for the union and its members and security for management and stockholders.

PENSION PLANS

The most significant example of expansion of the agreement into new areas involved pensions. The institution of formal pension programming by agreement with the union first took place in a major contract in the Hawaiian stevedoring industry on the employer's initiative. Subsequently, protracted negotiations produced formal agreement on pensions for employees of the sugar industry. These agreements, which have all the conventional complexities of pension plans, guarantee employees appropriate retirement benefits. At the same time management has adequate freedom to make provision for the benefits through funding arrangements.

Meantime, there had been increased emphasis on training. Training hourly paid workers in new skills and higher levels of old skills had to accompany changes in ways of harvesting and milling cane. Training the supervisory organization took place in many areas: in the management of new equipment, in handling of people under new conditions, in new organizational relationships arising from the development of staff departments, and use of such special control techniques as budgeting. The abandonment of a railroad in favor of truck hauling, for example, called for considerations of cost, engineering, union relations, training, budgeting and planning in terms which would not have been easily visualized in prewar days.

Among the interesting and satisfactory developments was culmination in 1948 of a workable classification system under which it was possible to assure equal pay for equal work across the entire industry. This permitted development of more precise promotional patterns and cleared the way for much of the training effort.

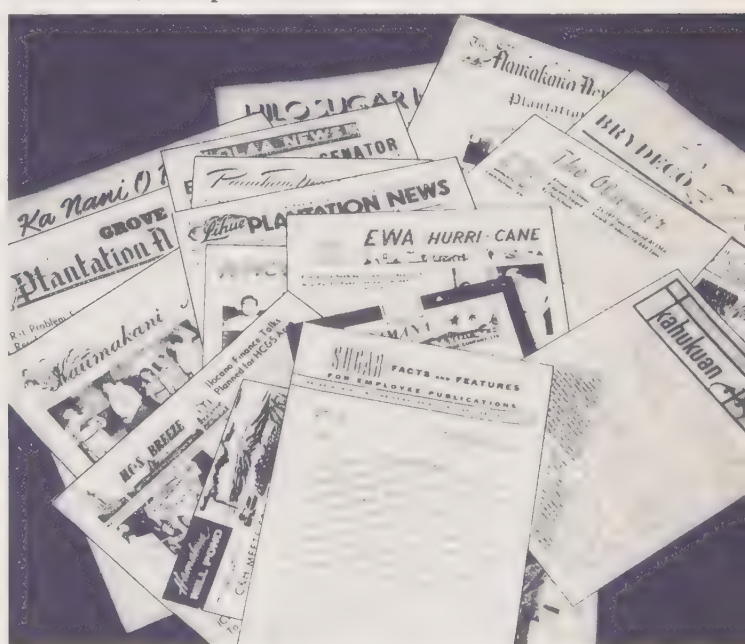
COMMUNITY RELATIONS

There has been growing awareness of the importance of good communications at the company and community levels. In recognition of the need to keep the conduct of its business responsive to public interest and attitudes the industry as a whole has made increasing use of communications techniques and media to improve public understanding of business policy, practices and problems.

New homes of sugar employees.



Publications, one aspect of communications.





Training for new skills.

There is corresponding need for management representatives to take an active, constructive interest in community affairs. In many plantation areas throughout the islands there has been notable progress in bringing the sugar companies and their surrounding communities closer together in an improved climate of mutual interest and understanding.

There has been substantial evidence of real growth in individual stature of employees and the members of their families. This growth has come about both through improved economic conditions, through the use of higher levels of skill and through meeting the larger demands of both the work and the community situations. Employees of the sugar industry have come from far and wide but they are merging as citizens, not only in the technical sense, but in the sense of personal orientation and participation in community affairs. Politically they have the strength of organization, but in the main it is doubtful if their votes can be controlled, other than by their own insight as to where their interests lie. The pattern of organized dealing is firmly established. The union is suitably secured as an institution and evidences maturity and growth in recognition of its responsibility.

The meaning of these 10 years is a matter for the future. However, certain things appear clear. The Hawaiian melting pot is more than a mere biological mixing. In the sugar industry it is a practical fusion of the intelligence and talents of Eastern and Western people who join their skills and cultures, and pool their energies to produce. The interests of all are not identical, but there is a sufficient community of overriding purpose to enable everyone to work together in what, for the welfare of all, must be a successful enterprise.



NEW TOOLS FOR BETTER JOBS

As the Hawaiian sugar worker has advanced over the past decade to higher skills and better pay and improved status in his community he has of necessity been provided with better tools with which to do his job.

Unlike most other American businesses, the Hawaiian sugar industry can not arbitrarily increase the price of its product to offset rising costs. With production, marketing and pricing all subject to government regulation, the imperative alternative has been a continuing search for improved efficiency through development of better methods and machines.

That the industry has been able not only to survive but to maintain year by year improvement in productivity and efficiency is an achievement for which management and employees must share credit with the scientists and agricultural and industrial engineers who have brought the plantations of Hawaii to a high level of mechanization.

New machines have appeared and many old procedures have either disappeared completely or exist in limited use only. For example, the mule and the hapai harrow, the cable conveyor from the cliffs of Kukuiahaele, the skiffs transferring bagged sugar from shore to ships at Mahukona, and the trucks carrying bags of raw sugar to island ports have completely disappeared as more efficient mechanization entered the scene. The picturesque locomotives pulling trains of cane cars have been replaced by trucks and trailers, and the narrow gauge tracks, by new road systems. The cultivator



Giant automotive hauling units replace locomotives and cane cars.

and the hoe, once the prime implements of attack in the fight against weeds, have now been relegated to special spot usage, giving way to chemical weed control.

The impact of mechanization during the past 10 years can be seen more clearly by following the various stages in production of cane and processing of raw sugar as they occur in the life of the cane plant.

BETTER PLOWS

The first phase includes plowing the land, preparing the seed bed and planting the seed pieces. Mechanization of these operations had progressed rapidly prior to 1947, and a more or less definite pattern had been developed by the various plantations. Three new machines have appeared, however, to assist in better plowing and seedbed preparation. They are the Towner disc plow, the Storey plow and the Howard rotary hoe. Each was developed to meet certain soil and field conditions. The Towner with four or five 44-inch discs turns the soil to depths of 18 to 22 inches. The Storey plow with two rotating tiller rings pulverizes the soil to a depth of about 20 inches. The Howard rotary hoe is useful for mixing trash into the upper surface of the soil to a depth of eight to 10 inches.

Planting machines have been improved to accommodate both solid and liquid fertilizer distributors and bins of cane seed pieces in bulk.

Two significant developments have occurred in the mechanization of cane fertilization. First is the use of the airplane for applying granular muriate of potash and urea on fields of cane that have closed in. Although the airplane found its first usage in application of pre-emergence herbicides for the control of weeds, its use as a machine for applying fertilizers has outstripped its function as an applicator of weed sprays, especially on the island of Hawaii. Nearly every plantation has its own airstrip and hardly a good flying day passes in which one does not see a plane applying fertilizer to cane fields. In 1956 over 20 million pounds of fertilizer were applied by air.

The second important development in fertilization has been use of aqua ammonia. Special machines have been developed for injecting aqua ammonia into the soil in unirrigated areas. Riding through the irrigated plantations, one observes tanks of aqua ammonia placed adjacent to irrigation flumes for applying this source of nitrogen in the irrigation water.

WEED CONTROL

One of the most sensational changes in plantation operations has been mechanization of weed control and the virtual elimination of the cultivator and hoe. This change begins at the mixing plant which all plantations have erected to prepare chemicals for the fight against weeds and grasses. Various constituents of a weed-killing spray are mixed and stored temporarily in tanks. The herbicide is transported to the field in a tank spray truck. Each member of the spray gang in the field carries a knapsack spray tank. The whole operation is synchronized to give the best possible man-day performance.

The airplane has also been used effectively to scatter pre-emergence chemicals onto cane fields before weeds and grasses germinate. The major drawback to its universal use for weed sprays is the fact that certain herbicides cannot be applied by air because of the drift hazard to other vegetation.

In certain fields, tractors with booms at either side are used to apply chemicals for the control of weeds and grasses. These newer tools have almost eliminated cultivator and hoe. In the wet area of the island of Hawaii, the cultivator has become a two-way piece of equipment. It can move in either direction without turning around.

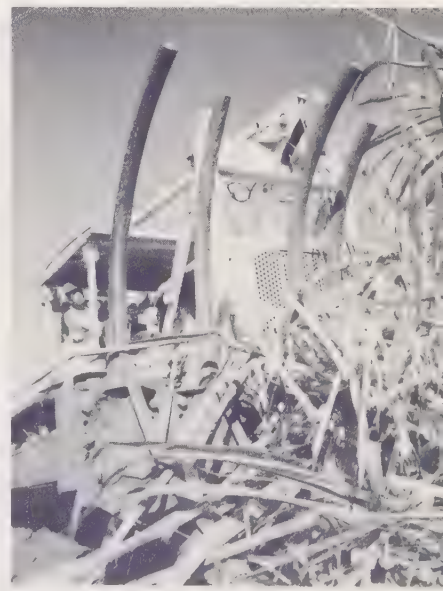
HARVESTING PROBLEMS

The next phase in the growing of sugar cane is the harvest operation. Mechanical harvesting first appeared on the Hawaiian scene about 20 years ago. Since that time, the push rake has become entrenched as the simplest, least expensive and most popular means of harvesting cane. But this method also has some disadvantages. Cane stools are pushed out. Soil is pushed into windrows. Cane is mangled and twisted, and there is sugar loss not only in the field but also during the process of cleaning.

The push rake windrows require a loading machine in the field. This machine discharges the contents of the grab into trucks which are brought into the field to transport the cane from the field to the mill. Although simple and effective, this sequence of operations leaves much to be desired from the standpoint of sugar losses and the efficiency of subsequent operations in starting the ratoon crop.

Some plantations use a somewhat different method, eliminating the push rake. A loading machine with the grab goes into the field and breaks off the cane in the grabbing operation and loads it into the truck for transporting to the mill.

The last 10 years have brought forth a determined attack by the industry on the problem of developing more efficient harvesting



Harvesting by push rake.

methods, including a more generally useful cane harvesting machine. Some experimental models show promise under field conditions, but none so far appears to be adaptable enough to meet the wide variety of conditions existing on the plantations.

A V-cutter is now being used on a majority of the plantations on the Big Island in unirrigated cane. This machine cuts two lines of cane at the same time, pushing it into windrows of two lines. The results are an improvement over the push rake method, but it is not regarded as the ultimate answer to the cane harvesting problem.

In 1947, the Agricultural Engineering Research Department of the HSPA developed a side-mounted, one-line cutter bar for cutting unirrigated cane. This machine did an excellent job in cutting the cane and was the first step in the evolution of the HSPA cane harvester.

VERSATILE CUTTER

After having developed the principle of cutting the cane, it was necessary to find out how it could be picked up. In 1948 a pickup-elevating conveyor was attached to the side of a tractor which dropped the cane onto a cross-conveyor mounted across the back of the tractor.

The next step was to "marry" the two machines into one. This was done in 1949 when a one-line machine for cutting and windrowing cane was developed and became known as the "side-mounted cutter-windrower." Although it was first designed for unirrigated cane, it was also adapted to irrigated conditions.

The next step was to attempt to design and develop a machine that would not only cut the cane, pick it up and discharge it into a transport unit, but which would also function in both directions so it would not have to be turned in the field or backed up as the side-mounted harvester. Late in 1956 the two-way cut-load cane harvester was given its preliminary testing at Olokele Sugar Company,

Side-mounted cutter-windrower developed by HSPA engineers.





Hilo bulk plant serves Big Island plantations.

on Kauai. In early 1957 the preliminary testing was continued at Grove Farm. Although many improvements are being made, this equipment appears to provide the closest approach yet to a harvesting process in which the cane does not touch the ground after it is cut.

Several different attempts were made to solve the problem of infield transportation under wet conditions. In the fall of 1951, the cane buggy made its appearance on the Hilo Coast. It is a self-propelled track-type machine that can travel in both directions and does not require turning in the field. It has a custom made chassis with wide tracks which reduce ground pressure enabling the machine to be used under extremely wet conditions without serious damage to the fields. It is self-dumping and discharges the cane adjacent to the roadside for delivery to the mill.

SELF-LOADER

In 1956 a new machine made its appearance at Hilo Sugar Company. It is the result of the combined efforts of the Field Engineering Department of the HSPA and the Engineering Department of C. Brewer & Company, Ltd. It is a self-loading transport that picks up V-cut cane and carries it to the roadside for grab-loading onto a highway truck. Essentially, it is a pick-up loader mounted on a cane buggy.

The past 10 years have seen almost complete elimination of cane trains in favor of trucking operations to transport cane from field to mill. This has meant not only large machines on the plantations, but also a development of networks of roads to accommodate them. Although trucks were used extensively at the beginning of this decade, the trend has been toward larger units such as the Tournahaulers, Euclids and Interhaulers with capacities up to 35 tons. There has also been increased use of truck and trailer cane hauling combinations, with the main truck hauling about 12 tons of cane and the trailer about 13 tons.

Another dramatic development has been the transition from bagged to bulk sugar; elimination of bags for shipping raw sugar and installation of bulk facilities for storing sugar at the ports and discharging it into the holds of ships. Special types of dump trucks carrying bulk sugar from the mill to the warehouse at the respective ports have been developed. These bulk warehouses are located at Hilo, Kahului, Nawiliwili and Honolulu.

Mechanical harvesting has also required installation of bigger and better cleaning plants at the factories. Mud baths in the cane cleaner for the removal of rocks are now part of practically all cleaning plants. At some plantations, closed circuit television is used to improve efficiency of the operation of the cleaning plant.

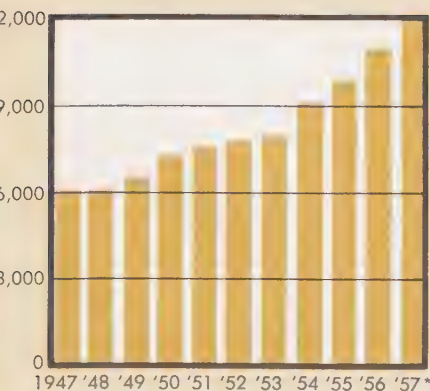
STEAM PRESSURE

High pressure steam boilers have been installed in the power plants of the sugar factories. Pressures have increased from 150 pounds per square inch up to 900 pounds per square inch in some factories. Likewise, the steam turbine for driving machinery has found its way into six mills. Milling rates have increased 50 per cent. Fully automatic centrifugals are now found in a large number of the mills.

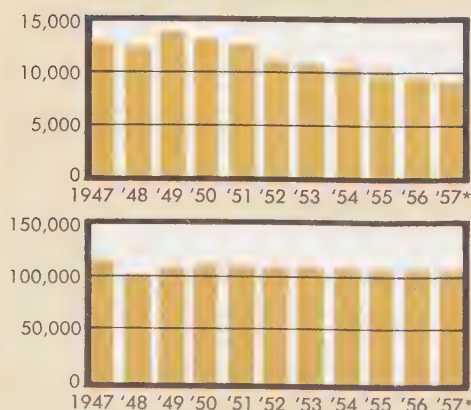
Most of the plantations would now feel crippled without their two-way mobile radio telephone systems which enable supervisors in the field to keep in touch with office, factory or various other sections of the operation.

While there have been many changes resulting in substantial gains in efficiency through use of new machines and better methods, further gains can be made. Engineers and research specialists with the backing of forward looking management are constantly seeking areas and opportunity for further improvement as the industry moves ahead to face the challenge of the future.

INVESTMENT PER EMPLOYEE

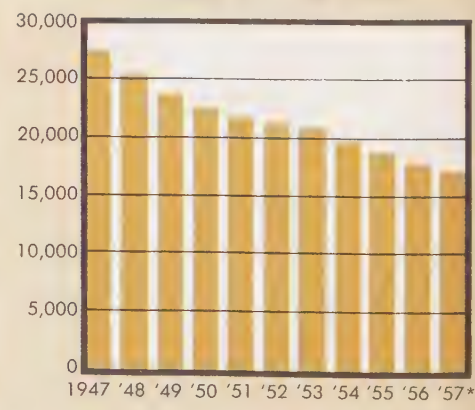


No. OF FIELD WORKERS



ACRES HARVESTED

DECLINE IN WORK FORCE



* estimated



SCIENCE IN THE FIELD

While industrial and mechanical engineers were busy with slide rules and drawing boards, soil chemists, biologists, geneticists and other agricultural scientists were pursuing their endless quest for more knowledge about the cane plant.

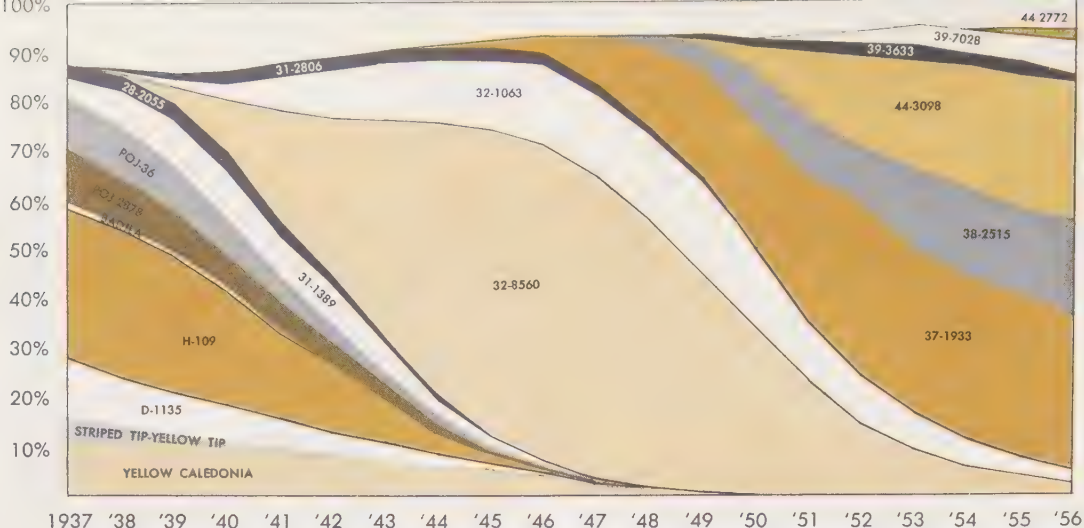
In laboratories and test fields the search continued for higher yielding varieties, more effective fertilizers and herbicides, better cultural practices.

The record of progress in the period covered by this report is an impressive list of achievements adding up to convincing proof of the value to the industry of the privately financed Experiment Station program through which the sugar companies of Hawaii pool their research and share the benefits of scientific discovery.

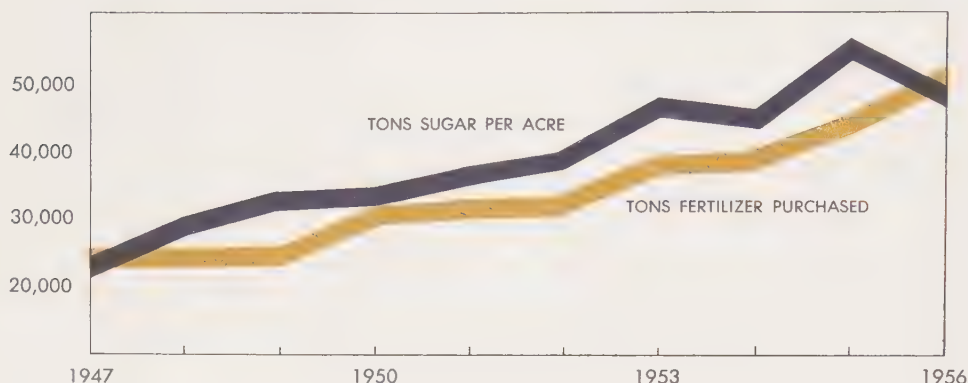
In both the plant and animal kingdoms the most important factor affecting production is high quality germ plasm. Hawaii's sugar industry has applied this principle with outstanding success to improve crop yields.

The first significant rise in the sugar production per acre curve in the history of the industry was recorded in the 1920's when production per acre increased 1.8 tons over the previous 10-year period. Significantly, the decade beginning in 1947 has also registered a 1.8 ton per acre increase over the previous 10 years. That small figure has big economic implications when considered in relation to the fact that average yield for the industry in 1956 was 10.28 tons per acre and that a one ton difference in yield may mean a profit or loss for a plantation.

CHANGES IN CANE VARIETIES



TONS FERTILIZER PURCHASED



TONS SUGAR PER ACRE

The achievement has resulted from the long range, patient and exhaustive cane breeding program which has sent HSPA scientists to remote countries and regions in search of new varieties with characteristics which will strengthen and improve productivity of canes presently in use.

As the breeding and testing program has progressed, older familiar varieties have been replaced with newer, more productive successors. There is generally a close parallel between the increase in yield on a given plantation and the percentage of land planted to newer higher yielding varieties. It is estimated that over 50 per cent of the increase in yields of sugar in Hawaii has resulted from the variety research program.

Yields, of course, are also affected by soil conditions, fertilization and other cultural controls. In this connection there were two other important developments in the genetics program of the HSPA Experiment Station during the decade. First was the research work on control of tasselling. Experiments proved that increases in sugar yields up to three tons per acre could be achieved by control of tasselling by artificial lighting in early September. However, the impracticability of lighting up cane fields caused the scientists to look in other directions to obtain satisfactory tassel control. This has been achieved by use of certain chemical sprays as well as by withholding irrigation water on irrigated plantations.

The second development has been the initiation of a cooperative attack on the fundamental problems associated with cane breeding between the Experiment Station and the Sugar Division of the Agricultural Research Service of the United States Department of Agriculture.

Closely allied with the progress in sugar cane breeding have been new developments in use of fertilizers. In 1947 the industry was using about 23,400 tons of nitrogen, phosphorus and potash in various forms. In 1956 this amount had jumped to 50,153 tons. This represented a 110 per cent increase in the amount of nitrogen used, a 108 per cent increase in phosphorus and a 128 per cent increase in potash.

BOTTLENECKS BROKEN

These higher applications of fertilizers were preceded by research information from the Experiment Station, the University of Hawaii, and the plantations themselves. For example, improved crop-logging techniques as guides for fertilizer application have expanded from four plantations in 1947 to the entire industry.

Soil and plant analyses have also aided greatly in the planning of fertilization programs. Well planned field experimentation has helped break several bottlenecks restricting maximum sugar production. An example is the research on soil phosphorus, calcium and potassium. This research formed the basis for the present fertilization program for most of the unirrigated acid soils. Airplane fertilization has made it possible to apply both urea and granular potash to unirrigated fields after the cane has closed in.

Prior to 1954, most of the fertilizer applied had been in the form of ammonium sulfate. In December, 1953, the first tanker load of aqua ammonia came to Hawaii. Since that day, the use of aqua ammonia has increased substantially. In 1956, fifty-seven per cent of all nitrogen fertilizer applied to sugar cane was in the form of aqua ammonia. This cheaper form of nitrogen resulted in significant annual savings to all plantations.

CHEMICAL CONTROL

Ten years ago, several of the plantations were fighting desperately to control various grasses. Cultivation techniques only spread these pests. A new chemical, trichloroacetic acid, better known as TCA, came to the rescue. Its appearance changed what appeared to be pasture fields with cane in them to clean cane fields. The well-known CADE has been reinforced with aromatic oils to increase its usage as a contact spray. Pre-emergence application of herbicides has come into wide use as a result of increased attention to such chemicals as 2,4-D and CMU. Recently another chemical, dalapon, has come to the aid of TCA in the control of hard grasses.

Use of some of these herbicides created the problem of corrosion in spray tanks. Experiment Station chemists developed a corrosion inhibitor which has found its place not only with the plantations of our industry, but in other areas as well.



Breeding cane varieties.



Aerial weed control.

There has also been a renewed interest in soil improvement. Organic residues such as bagasse and cane trash are being used in a large number of cases to improve heavy clay and light sandy soils. Yield increases of up to three tons of sugar per acre have been obtained from heavy clay soils from this improvement program. With larger quotas, plantations are giving increased consideration to improvement of poorer-yielding areas within cane fields.

Recently some plantations have been troubled by outbreak of plant disease. The industry had been coasting along more or less confident that disease-resistant varieties combined with careful cultivating practices had the problem fairly well under control. Cooperative research with the Colonial Sugar Refinery Corporation of Australia in the screening of Hawaiian varieties for the dreaded Fiji and downy mildew diseases was functioning well in the Fiji Islands. Then, first noticed in Australia, an insidious disease, ratoon stunting, made its appearance throughout the sugar cane world, including Hawaii. Fortunately, the visual symptoms have not been found to be widely spread on the plantations in Hawaii. Precautionary measures such as the long hot-water treatment of seed were initiated.

Experiments were inaugurated to determine the reason for the decline in yield of varieties. Tests on the island of Hawaii, especially, pointed out that soil fumigation had an important effect upon growth and yields. This has led to the initiation of research on soil fumigation to find out if the sugar industry can profit through the control of nematodes and other soil organisms.

In 1957 the third most widely used variety in the Islands, 38-2915, was hit seriously by a fungus disease known as red rot. It is the first time since the day of root rot and eye spot that the industry has seen such an eruption of a serious disease. Its outbreak has accentuated the importance of the cane breeding program as plantation managers search for varieties to replace 38-2915.

PORTABLE FLUMES

There has also been increased emphasis on scientific aspects of cane irrigation. Some plantations have experimented with light aluminum flumes for carrying water to the cane lines. These flumes are portable and can be removed from the field at harvest time. Research has demonstrated effectiveness of using instruments for controlling irrigation intervals. Porous cups known as tensiometers are placed in the soil and the amount of water withdrawn by the plant is indicated by a dial on a gauge. This shows relative degree of wetness of the soil. Gypsum blocks, the electrical resistance of which

Cane disease study.



Portable aluminum flumes.



Checking soil compaction.



varies with the amount of water in the soil, are placed within the zone of root concentration to measure the moisture content of the soil as the plant extracts water.

Experiments on water distribution have helped plantations improve efficiency of irrigation layouts. More recently, there has been renewed interest in overhead irrigation and an expanded research program is in progress.

Studies are being made throughout the industry to measure effect of heavy machines on soil compaction. The results of these studies have already changed certain plantation practices.

The island of Hawaii has always been plagued with soil erosion resulting from heavy downpours of rain. To help solve this problem diversion ditches have been installed to intercept the flow of water and lead it off into gulches where it will do no harm. The revolutionary practice of strip-cropping long slopes with different ages of cane has been put into operation in the Kau district.

COOPERATIVE TESTS

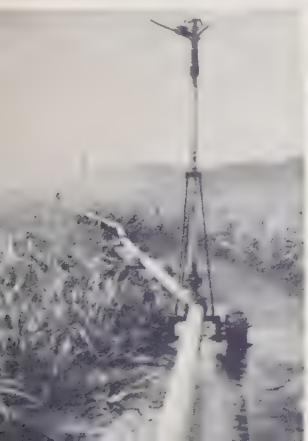
Individual costs to the plantations of necessary field experiments have been reduced by a program of group testing. Several plantations cooperate with the Experiment Station in placing replicated plots in their fields. This program of testing does not concentrate the experimental plots in one field on one plantation, but spreads them over a number of plantations. This cuts down cost and increases the value of the results.

The old technique of harvesting experimental plots by cutting and pulling all of the stalks of cane has been superseded by what is known as slash-cutting. This has reduced the labor cost of harvesting by about 50 per cent.

Along with slash-cutting has come the method of sampling and analysis known as the pol ratio method. With this technique, the slash-cut material is placed through a silage cutter and a sample of the material is analyzed in the laboratory for both purity and fiber. This method of sub-sampling and analysis makes it possible to determine results without the necessity of milling the cane to get juice samples.

On the islands of Oahu and Kauai, representatives of the Experiment Station have been provided with "task forces" which the plantations use in harvesting experimental plots. All of these developments are aimed at making it possible to have the highest type of field experiments at the lowest possible cost.

Overhead irrigation.



Cataloging insects.



Controlled climate test.



Tasselling experiments.



The Experiment Station has been one of the leaders in the use of radioactive isotopes in agricultural research. Radioactive carbon (C14) has been used to study how the plant makes sugar and distributes it throughout its various parts. Radioactive phosphorus (P32) has been used to study how plants absorb nutrients from the soil. It has been instrumental in giving a picture of correct placement of phosphorus for maximum cane growth. Radioactive rubidium (Rb86) has been used to help find out how water is distributed in irrigation lines. Radioactive cobalt (Co60) has been used to determine whether it can serve as a means for the continuous weighing of bagasse and raw sugar at the mill. Heavy nitrogen (N15) has been used to evaluate the nitrogen nutrition of the plant. Radioactive strontium (Sr90) is used in the study of methods of recording sunlight energy and temperature.

Scientific research has made many contributions in the processing of raw sugar at the factories. The salt problem on Maui has been found to be associated with the high concentration of potassium chloride. This has led to cooperative research in the use of ion-exchange membranes to help solve the problem. It has shown the importance of certain constituents of the cane juice in relation to crystallization of sugar. Clarification of juices has been expedited through the appearance of polyelectrolytes such as Separan.

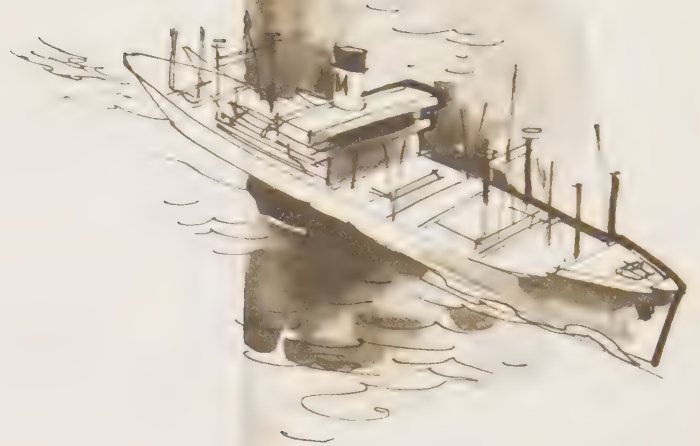
BY-PRODUCTS RESEARCH

Finally, in the past five years we have conducted a review of the by-product possibilities available to us. Some 65 uses for bagasse have been explored, ranging from wallboard to cattle feed. The basic problem is to find a product that will employ a significant amount of the 1,000,000 tons of this residue produced each year which can be profitably marketed on the mainland despite freight costs. Pulp and paper seem the most likely possibilities. Cooperative research with Crown Zellerbach continues aggressively. The by-products review also underlined the need for more fundamental work on the properties of waste materials and led in 1955 to creation of a Department of Organic Chemistry at the Experiment Station.

The foregoing review indicates that substantial progress has resulted from the industry's research program. It is, however, a continuing process with promise of further achievement as new techniques are developed and discoveries by the agricultural sciences are applied to plantation operations.

Radioactive isotopes
aid sugar research.





HAWAII'S SUGAR GOES TO MARKET

While important from the standpoint of scientific advance and progress in management techniques, the achievements of Hawaii's sugar industry have economic significance only to the extent the sugar produced by this coordination of effort finds a market.

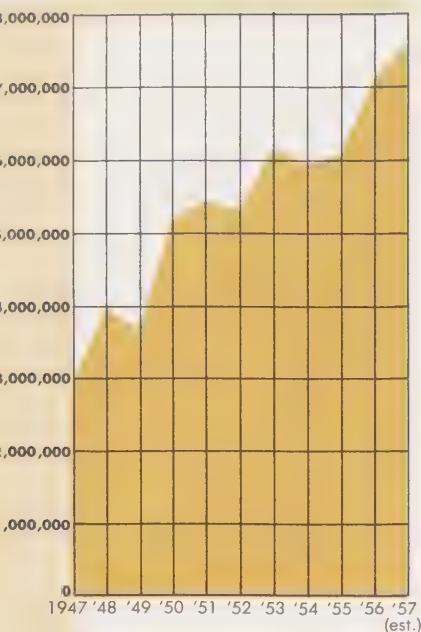
When Hawaii's sugar reaches the mainland it enters a strange new environment in sharp contrast with the orderly controlled procedures it followed to get there.

Like an island youth leaving the calm of a little plantation town to seek his fortune in Chicago or San Francisco, sugar from Hawaii is caught in the rough and tumble of competition strangely and at times painfully different from the comforting protection of its accustomed homeland.

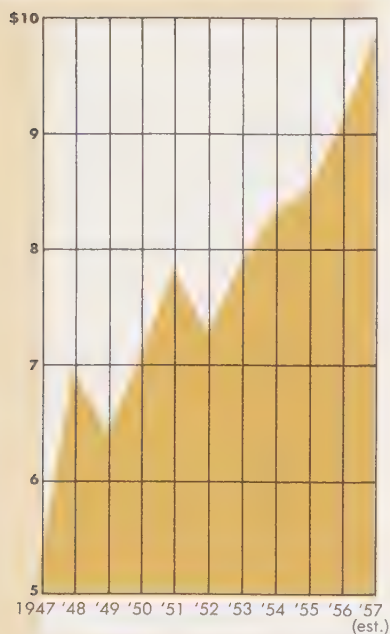
Postwar forces and factors which have so dramatically changed living standards, flooding the land with a vast tide of new consumer goods and services, have all had an effect upon the buying habits and preferences of Hawaii's sugar customers.

All this has required sharp shifts and revisions of consumer products and marketing procedures. It has taken a substantial outlay in new capital improvements and investment of vast sums in advertising and promotional programs to enable Hawaii to maintain its competitive position.

The responsibility for the successful sale of Hawaii's sugar in the increasingly competitive market rests with the California and Hawaiian Sugar Refining Corporation. C and H is a non-profit cooperative jointly owned by the 27 sugar companies of Hawaii. Its function is to sell the sugar produced in the islands, to refine as much of it as the market demands, and to package it in the form for which sales opportunities can be developed.



**C and H REFINED SUGAR
MARKETING COSTS ONLY**



**C and H REFINED SUGAR
MARKETING COSTS PER TON**

No other 10-year period has seen the magnitude of change influencing the marketing of C and H sugar as did the period between 1948 and 1957. This period saw basic changes in characteristics of the grocery industry; introduction of mechanized delivery and inplant handling of sugar for food manufacturers; introduction of new sugar products, and most notably, changes in the nature and intensity of competition.

BUYING HABITS

A major trend of the last decade is the substantial increase in industrial use of sugar. The American homemaker has accepted in increasing degree the convenience of buying from her grocer the finished products formerly prepared at home. The result has been that although only one-third of all sugar consumed in the United States prior to the war was sold to food manufacturers, two-thirds of all sugar consumed in the U. S. today is processed by food manufacturers before entering the home.

The grocery industry itself has undergone a major change. The old line wholesale grocery has given way to the modern, high-volume, low-cost distributor, who has replaced the salesman with a mail-in order form. The retail grocery has been broadly replaced by the modern supermarket and the retail clerk replaced by the self-service display. The burden of creating product brand demand now rests squarely on the shoulders of the sugar refiner. This added responsibility on manufacturers of consumer products has placed new emphasis on advertising, merchandising, and package design. The need to meet competitive activity in this field has increased the investment in advertising and sales promotion six-fold from 1948 to 1957. The soundness of this investment has been proven time and again by the ability of the C and H brand to withstand uneconomic competitive prices and practices.

BEETS COMPETE

In the decade, beet production in the five Pacific states increased by 46 per cent—a rate greater than the market growth of 41 per cent from 1947 to 1957. Although C and H maintained a policy of marketing a normal share of its production in the Midwest, it soon became increasingly obvious that beet sellers were determined to ship a smaller portion of their production to the Midwest at the resulting lower net return. Beet processors were expected to sell about 86 per cent of their five Pacific states production within the area in 1957, in contrast to only 66 per cent in 1947.

In 1947 the beet sugar companies produced only a limited assortment and concentrated selling efforts on manufacturers of food products. The grocery consumer package market and certain segments of the manufacturing trade were preponderantly supplied with cane sugar. Immediately following the lifting of wartime controls, the beet industry moved to remedy their two major handicaps, limited assortment and the traditional preference for cane sugar. Full lines of grocery consumer packages were developed and offered

by major beet companies. There was also an aggressive brand advertising campaign by each beet company in its respective marketing territory.

In 1948 the beet companies formed the Western Beet Sugar Association, appropriating an advertising fund of \$3,000,000 to overcome the cane preference and accomplish a general consumer acceptance of beet sugar. Unfortunately, in 1949 labor difficulties, both in Hawaii and on the mainland, cut off the supplies of C and H sugar and encouraged distribution of newly offered beet packages throughout the grocery industry in the West.

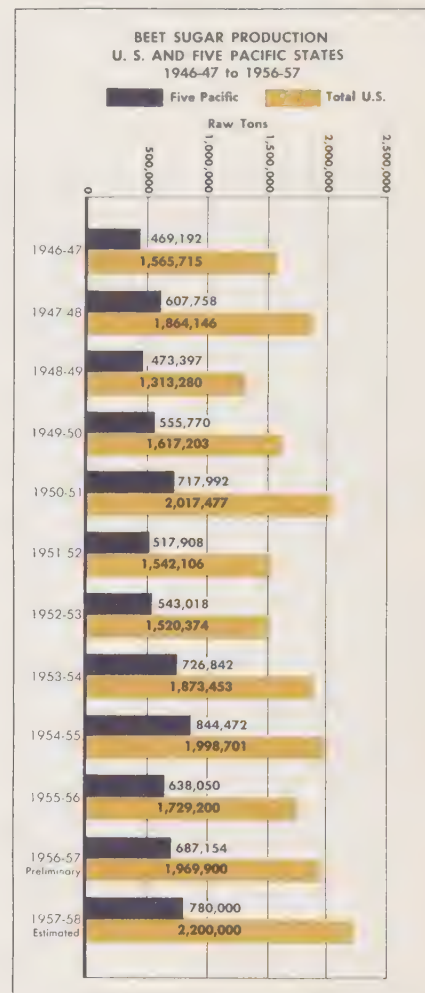
Coupled with changes in its marketing approach, the beet industry made a spectacular recovery in production from the low point reached in the 1943-44 wartime crop year. Development of segmented seed and mechanization of beet harvesting reduced costs. Improvement in disease control and in growing practices resulted in increased yields. The reduction in the acreage allotments and price support of many competitive crops following the war increased the relative attractiveness of sugar beets as a cash crop and encouraged plantings to the limit permitted by the Department of Agriculture.

The change in sugar legislation in 1956, providing the domestic producers a share in the growth of the U. S. market, opened the way for further increases in beet production with the attendant increase in competitive selling pressure. Beet production became more concentrated in the West with the states of California, Oregon and Washington accounting for approximately 36 per cent of the total U. S. beet crop.

CONSUMER DEMANDS

All of these developments have required an investment of some \$17,000,000 in improvements in the Crockett, California, refinery and affiliated distribution facilities. The greater portion of the development effort has been required to meet increasing consumer demands for new products and improved methods of handling dry and liquid sugar. New methods have been devised for improving sugars sold to confectioners and industrial users. New equipment and procedures have been installed for more efficient production of wrapped pressed sugar and individual services for hotels and restaurants. Methods have been found for conditioning granulated sugars to permit shipment in large bulk units. Similar techniques have been devised for shipment and storage in liquid form. Further advances will be necessary to meet the increasingly rigid requirements of the large industrial customers.

The most significant development tonnagewise in refined sugar distribution has been the growth in sales to industrial users. Since 1948 through 1957, C and H has spent \$2,328,000 for such items as bulk granulated storage bins, liquid sugar manufacturing and storage equipment, manufacturing facilities for specialty sugars and specialized transportation equipment. To minimize the cost of distribution of these bulk products and to provide necessary services



to our customers, storage and delivery facilities have been constructed in Seattle, Portland, and Los Angeles. In the 10-year period beginning in 1948, C and H sales of bulk and liquid sugar grew from 20,000 tons to over 150,000 tons annually, and continued growth is a certainty.

Since the Crockett plant is over 50 years old many basic elements of equipment have either worn out or become obsolete and have required replacement with modern and more efficient machinery. The largest single item in this category is the boiler house and power plant, on which \$5,000,000 will have been spent through 1959.

AUTOMATIC PALLETIZERS

Storage and handling facilities for bulk raw sugar at Crockett were an integral part of the program for complete bulk handling of Hawaii's sugar. A comparable modernization in handling methods is represented by the new equipment in the refined sugar warehouse for receiving the cases or bags from production and automatically placing these on pallets. When the automatic palletizers are all installed in 1958, the C and H facility will be the largest operation of its kind.

In 1956 C and H purchased a minority interest in the Imperial Sugar Company. Imperial has been operating as a refining company at Sugar Land, Texas, for many years. The plant has a refining capacity about one-third that of the Crockett refinery. Imperial uses the bone-char process of refining, the same as that used at Crockett. In recent years Imperial has expended several million dollars to modernize its plant.

Under a long-term agreement a large part of the Hawaiian raw sugar formerly sold to East Coast refiners will be sold to Imperial. This arrangement will provide a firm outlet for raws formerly sold to East Coast refiners and provides Imperial with a dependable source of bulk raw sugar. Raw sugar processed at Sugar Land is unloaded from steamers at Galveston and moved inland 58 miles to Sugar Land by rail.

WELL LOCATED

Imperial sells the greater part of its output in Texas which, like California, has been experiencing a rapid increase in population. Imperial's refinery is well located to meet the competition from cane refiners in the New Orleans area and from beet sugar producers in Colorado and Nebraska.

The acquisition of the Imperial interest has broadened the market for Hawaii's sugar and should offset to some extent beet competition in the western states. There are, however, no assurances the future holds any less challenge for Hawaii's primary product than the turbulent 10 years immediately past. The substantial improvements in plant and services and recent experience in a highly competitive market should strengthen the C and H organization to meet whatever new challenge the future may bring.



C and H refinery at Crockett.



DOLLARS FROM SUGAR

World War II and the 1946 strike combined to present the industry with its gravest financial crisis since the days of the Hawaiian kingdom. Vast capital outlays were required to replace equipment run down during the period of wartime manpower and material shortages. More capital was needed to mechanize in the face of rising wage costs and of keener competition from other sugar areas. Meanwhile, cash had been drained by the 79-day strike.

The ensuing 10 years saw the industry spend \$114,000,000 in Hawaii and \$17,000,000 at C and H on capital goods. In the same period, while the price of sugar remained relatively constant, the overall cost of production was rising sharply. That the industry as a whole has been able to remain marginally profitable and emerge relatively free of debt is a tribute to management skills and the energy and ingenuity of the men who staff the plantations.

The money used in the Islands in the rehabilitation and mechanization of the industry was drawn from prior and current earnings, depreciation and borrowings. There was no significant resort to equity financing.

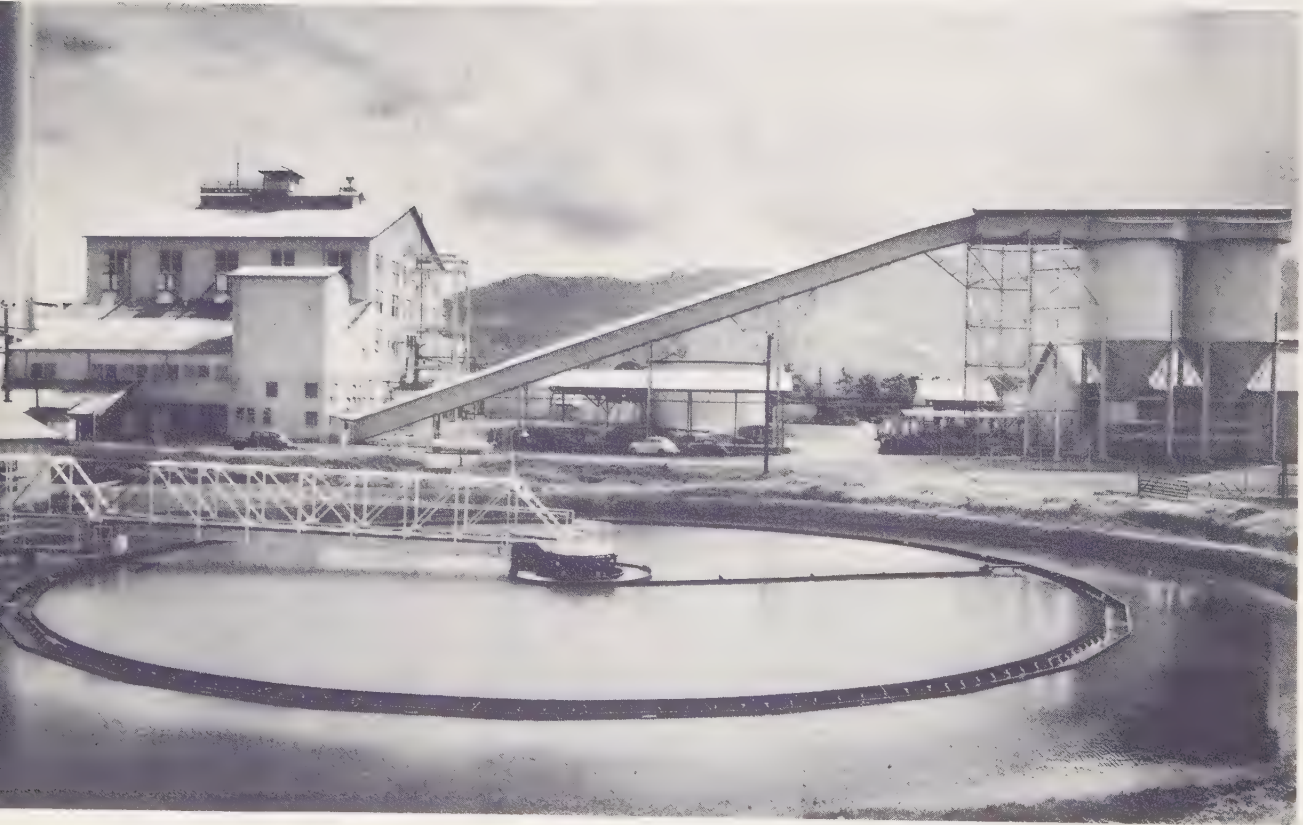
MILLIONS SPENT

Replacement of housing, restoration of clean culture to the fields, rehabilitation of equipment—the general business of getting the plantations' housekeeping back in order following wartime shortages—claimed many millions of the capital sums spent in the last 10 years. But by far the largest amounts went into mechanization. Mechanical harvesting required installation of cleaning plants costing up to a million dollars each. Truck replacement of the old cane-hauling railroads required building many miles of plantation-owned roads. Herbicide control of weeds necessitated erection of mixing plants. Aerial fertilization meant the building of air strips. Application of nitrogen in aqueous form dictated the construction of special distribution devices.

Industry borrowings to achieve this mechanical revolution peaked at about \$35,000,000 in 1949. By the close of 1956 the plantations' obligations (including those of their agents who in many cases pledged their credit to pull the plantations through) had declined to \$7,000,000.

In the same period the cooperatively-owned C and H was having its capital problems too. These were dictated not only by the effects of the war and obsolescence of fundamental equipment like boilers in the 50-year-old refinery, but by changes in marketing practices and

This hydroseparator typifies postwar facilities requiring large capital investments.



competitive factors. Of the \$17,000,000 required at C and H in this period, \$10,000,000 was obtained by insurance-company loans. This is being repaid by withholdings from the returns to the plantations on each ton of sugar delivered. By the end of 1956, C and H's long-term indebtedness had been reduced to \$4,000,000.

EXPENSES UP

By mid-1957, most of the expenses of the plantations had risen dramatically. For example, basic wage rates alone have increased by 59 per cent. Depreciation allowances due primarily to mechanization have increased from \$5,100,000 to \$8,300,000 annually. Transportation per ton of sugar is up 68 per cent since the beginning of 1947.

On the other hand, the average price of raw sugar in 1956 was below that of 1947. In only two years, 1952 and 1953, did the price of raw sugar exceed that of 1947, and then only by a few cents per ton. The plantations have been able to stay in business in the face of this cost-price squeeze only through mechanization and a substantial increase in yields. The average acre in cane today yields 2.22 tons more sugar per year than in 1946. It is the revenue from these added yields, combined with a stabilized total labor cost, that has permitted the industry to remain competitive.

TOTAL \$130,600,000



1956

1955

1954

1953

1952

1951

1950

1949

1948

1947

PLANTATIONS

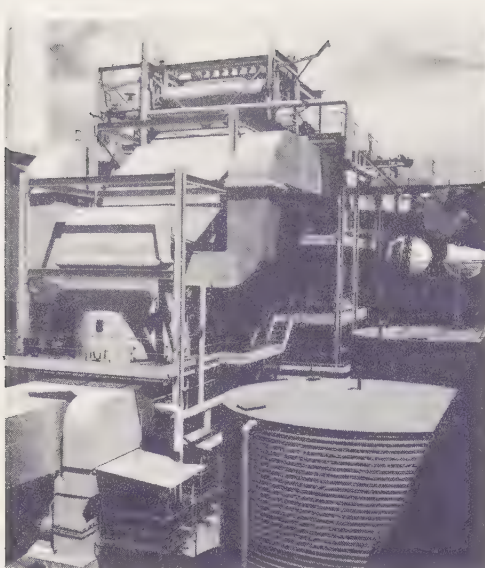
C&H

PLANTATIONS

C&H

1947	\$23,700,000	1947	\$ 2,000,000
1948	15,600,000	1948	2,200,000
1949	11,500,000	1949	1,200,000
1950	9,200,000	1950	900,000
1951	10,800,000	1951	900,000
1952	8,600,000	1952	900,000
1953	9,700,000	1953	1,200,000
1954	9,600,000	1954	900,000
1955	7,000,000	1955	1,500,000
1956	8,200,000	1956	5,000,000
	<u>\$113,900,000</u>		<u>\$16,700,000</u>

COST OF CAPITAL IMPROVEMENTS



A steam generator,
another major investment.

It is noteworthy that in any given year, compliance payments made to the plantations by the Federal Government almost equal profits. These are payments made for compliance with the quota and other provisions of the Sugar Act. They are drawn from an excise tax of \$10.70 a ton on every ton of sugar processed by C and H and the other domestic refineries. As an example, in 1955 Hawaii produced 1,140,000 tons of sugar on which excise taxes of \$11,400,000 were paid. Compliance payments to the industry totaled \$10,500,000 for that crop and thus the U. S. Government netted \$900,000. There are many beneficial controls on the industry under the Act and the tax-compliance payment feature is an ingenious and effective device for making these controls work. However, compliance payments, sometimes viewed by the uninformed as a bonanza, are as a practical matter merely a return of their money after the sugar companies comply with certain regulations.

EARNINGS LOW

Even with the compliance payments, the earnings of the industry in general have been meager. Earning capacity has varied from company to company. A few plantations have been able to earn six and seven per cent on net worth. Others have been able to earn between three and four per cent, and a remaining few have been unable to get upon a profitable basis. In contrast, the average return of profits on net worth for U. S. corporations for the decade was about 10 per cent.

Low returns and the industry's cash requirements have combined to restrict dividend payments by even the more profitable plantations over the past 10 years. These circumstances will continue as the industry faces further expenditures for improved harvesting devices, new cane varieties, better transportation, and intensified by-products research.



THE WASHINGTON SCENE

Like that of any other business operating under federal controls, the future of Hawaii's sugar industry hinges heavily on what happens in Washington, D. C., some 5,000 miles from the cane fields of these mid-Pacific islands.

Over the years the long arm of Uncle Sam has guided the destiny of sugar from Hawaii almost as much as the combined effort of men, management and machines working together in the islands.

In contrast with the crises and upheavals which characterized the preceding 10 years of the New Deal era, the decade covered by this report has been a period of relatively stable relations between industry and government.

There have been some tensions and uncertainties and some disappointments with respect to price determinations, but on the whole legislation has been improved giving the domestic industry, including Hawaii, strengthened protection.

The Hawaiian industry, through the Hawaiian Sugar Planters' Association, maintains an office and representation in Washington. The office serves as a listening post and liaison agency through which the HSPA maintains contact with members of the Congress, with various government agencies and with representatives of other domestic and foreign sugar producers.

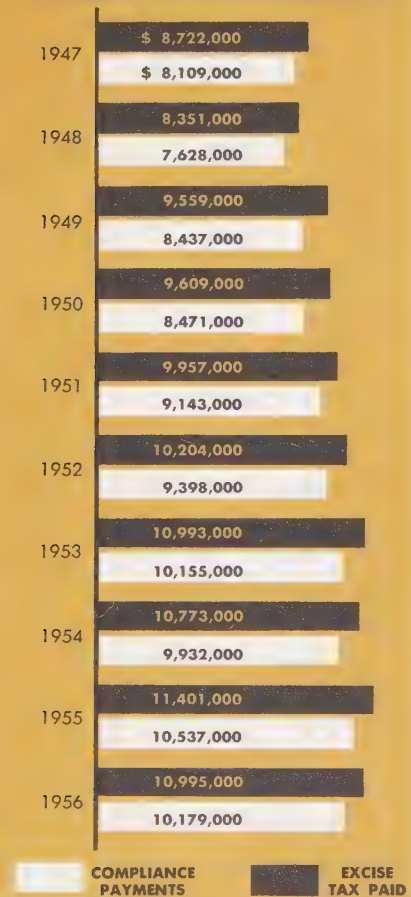
During World War II quotas governing domestic production of sugar were suspended and were not re-imposed until January 1, 1948.

Meanwhile, the Sugar Act of 1937 had been extended from time to time without amendment. The final action was on July 27, 1946, to extend the act to December 31, 1947.

In contrast with prewar rivalries, representatives of various sugar producing areas composed their differences in 1947 and appeared before the Congress with agreed-upon recommendations for amendment and extension of the 1937 Sugar Act. President Truman signed this legislation (known as the Sugar Act of 1948) on August 8, 1947, to become effective January 1, 1948. Principal differences from the previous act were: (1) Establishment of fixed instead of percentage quotas for domestic areas, and (2) Revised standards for setting annual consumption estimates. Hawaii's quota was fixed at 1,052,000 tons instead of the former 25.25 per cent of that portion of the total quotas assigned to domestic areas.

On September 1, 1951, legislation amending and extending the Sugar Act of 1948 was signed by the President. The new act was substantially the same as the previous one except for quota adjustments.

**FEDERAL EXCISE TAXES PAID BY
HAWAIIAN SUGAR VS. U. S. COMPLIANCE
PAYMENTS TO HAWAIIAN GROWERS**



ACT EXTENDED

During the sessions of 1955 and 1956 the Congress gave consideration again to amending and extending the act. Finally, the new act was signed by President Eisenhower on May 29, 1956, extending the effective date to December 31, 1960.

The most significant change was restoration to the domestic areas of their right to share in increased consumption of sugar in the United States. This provision should enable Hawaii to expand production gradually.

Administration of the Sugar Act has a direct and vital bearing on the health of Hawaii's industry. The act is administered by the sugar division of the Department of Agriculture. This division has the following principal functions:

1. To prepare and promulgate, in December of each year, the estimate of consumption in the United States for the succeeding year and to revise such estimate from time to time;
2. To determine and administer quotas pursuant to the estimate of consumption;
3. To establish, when necessary, marketing allotments and proportionate shares of quota production;
4. To administer the provisions of the act with respect to conditional compliance payments; and
5. To deal with violations and complaints under the act.

Congress included in the act an admonition to the Secretary of Agriculture to administer the Sugar Act "to protect the welfare of consumers and of those engaged in the domestic sugar industry by providing such supply of sugar as will be consumed at prices which will not be excessive to consumers and which will fairly and equitably maintain and protect the welfare of the domestic sugar industry."

Although the present Act does not expire until the end of 1960 it is expected that the Congress will give consideration to its extension and amendment in the session of 1959 and thus avoid involving the legislation in crosscurrents of an election year. Conferences among various sugar area representatives will probably begin some time in 1958. It is expected that at that time the act will be under attack by industrial users who perennially complain that it is prejudicial to their interests, and by critics of the quota-compliance payment-tax system.

MAJOR CHALLENGE

Two events in the past 10 years have provided a major challenge to the Secretary to demonstrate the effectiveness of the Sugar Act in times of critical world sugar conditions. During the Korean crisis and again in 1957 the so-called world price for raw sugar skyrocketed. By using the tools provided in the act the Secretary succeeded in maintaining the domestic price at a fairly even level with adequate supplies for consumers. The hope is that in the face of declining sugar prices he will recognize his collateral obligation to the producers by maintaining prices which will protect the economic health of the industry.

In addition to representing Hawaii in all deliberations and hearings involving federal control of the domestic industry, the HSPA has also participated in formulation of national policy related to the world market.

The International Sugar Agreement, negotiated in London on October 1, 1953, at a conference called by the United Nations, was ratified by the United States Senate on April 28, 1954. This pact replaced the Agreement of 1937 which was largely inoperative because of wartime and postwar dislocations of world sugar trade. Work on the new agreement was begun in 1948, and 50 countries participated in the negotiations.

GENEVA AGREEMENT

It soon became evident that if the Agreement of 1953 were to continue to be a real factor toward providing world market stability, there would need to be amendments. Changes in export quotas for participating producing countries, a review of price ranges and an effort to secure wider membership appeared to be necessary. Accordingly, the United Nations called a conference on May 21, 1956, to provide such reexamination and renegotiation. This resulted, after prolonged and intermittent discussions, in the adoption of a new agreement in Geneva, Switzerland, on November 2, 1956. The United States Senate confirmed the agreement on August 8, 1957. HSPA representatives participated in many of the discussions leading up to the establishment of the position taken by the United States delegations.

It should be emphasized, however, that the Sugar Act of 1948, as amended, remains the controlling factor in the United States sugar industry and for foreign supplies entering this market. Its terms are not affected by the International Sugar Agreement.

AVERAGE NY SPOT PRICE
— RAW SUGAR —

1947	\$124.33
1948	111.37
1949	116.12
1950	118.65
1951	121.21
1952	125.27
1953	125.76
1954	121.80
1955	119.02
1956	121.76

Recent years have seen development of increasingly effective and constructive association among the various domestic producers. Again, through the HSPA's Washington office, Hawaii has contributed to this progress.

The result has been a working relationship which has enabled the domestic producers from cane and beet areas to form a community of interest and unity of position on legislative matters, but at the same time to maintain spirited competition for customers.

Maintenance of this balance between cooperation and competition has been achieved largely through the formation of three organizations, each designed to meet problems in which the various producers have a common interest.

NEW USES SOUGHT

These problems may be grouped in two main divisions. One involves the common interest all sugar producers have in combating the promotional efforts by manufacturers of synthetic sweeteners and food fadists and others attempting to discourage use of sugar as a food. The other area of common interest involves the joint program by sugar producers to find new industrial uses for their product.

The formation of three organizations has facilitated efforts by sugar producers to deal with these problems. The organizations are The Sugar Association and its affiliates, Sugar Research Foundation and Sugar Information. All are supported by national and foreign producers.

Sugar Research Foundation was the pioneer organization. The HSPA participated in formation of the Foundation in 1943. The research work and educational activities have developed rapidly. Since 1943 the Foundation has made 131 grants to universities and private laboratories for support of research.

ADVERTISING PROGRAM

Sugar Information carries on educational work, prepares and distributes technical and popular publications and promotes understanding of the place of sugar in the human diet. A program of advertising and public relations is conducted on a national scale to promote public knowledge of sugar and its uses.

The Sugar Association determines basic policy and functions as the financial agent for the two affiliates. It has 100 sustaining members in the United States, Cuba and the Philippines, and 18 associate members in countries ranging from England to South Africa and India, and from Canada to Peru.

The Hawaiian industry has been a substantial financial supporter and active participant in all this work.

Thus through the Washington office the HSPA has over the years maintained constructive and effective relationship with legislative and administrative branches of government and with the various other producers whose combined interest and efforts have dealt with problems and projects affecting the future of Hawaii's basic industry.

THE SUM AND SUBSTANCE

The 10 eventful years that have passed since the war have confronted our industry with a series of perplexing problems. In meeting them on a day-to-day basis, there is a tendency to lose sight of their magnitude or the stature of the accomplishment in staying in business on a profitable basis.

In 10 years major advances have been made in the area of human relations. A labor contract has emerged from the shell that was the agreement at the close of the 1946 strike to become an intricate but well-defined and workable pattern for on-the-job relationships. Employees have gained substantial improvements in their standard of living, status and security. The security of the union itself has been strengthened.

In the process of working out these problems, management has become more mature and seasoned and can now act with greater confidence in dealing with labor matters as they arise. Still another important factor is that we have retained protection for management's authority and control in reasonable proportion to management's responsibility for the success of the business.

In the same period our relations with the community as a whole have improved. To some degree this has come about because the burgeoning defense and tourist businesses have made sugar less conspicuous as the principal employer and biggest source of private income in Hawaii. But it is also due to the willingness the industry has displayed to tell the facts concerning its problems and purposes to everyone who will listen.

PUBLIC'S RIGHT TO KNOW

There was once a disposition in the industry to let results speak for themselves. Actions speak louder than words, but good deeds and good intentions by themselves are not enough. They must be fully reported and interpreted to gain proper public understanding and acceptance. One of the industry's greatest accomplishments since the war has been to recognize and act on the principle of the public's right to know.

What amounts to an industrial revolution has occurred in fields and factories in 10 short years. Under the pressures of the cost-price squeeze, the industry has been able to remain in reasonably sound economic condition only through increased productivity. This has been accomplished by development and application of new and improved methods, machines and materials. Mechanization is effective, however, only if the human element is carefully and fairly evaluated and adjusted to the process. This, in turn, has required close integration of effort on the part of the industrial relations specialists, industrial and agricultural engineers and scientists.

EFFECT OF COMPETITION

The cooperation that has traditionally characterized Hawaii's production of sugar extends to processing and marketing through the efforts of the cooperatively-owned California and Hawaiian Sugar Refining Corporation. However, there is little cooperation beyond that point.

Intense competition for markets is the rule of the game. Hawaii's competitive position has been complicated by increased production of beets in the Western states, interruption of ability to supply customers in times of shipping strikes and other labor trouble, and radical changes in consumer requirements and marketing practices.

Competition for the household market, coupled with the advent of self-service super-chains, has made selling sugar a package and brand-identification business. Industrial users, on the other hand, are demanding deliveries in bulk, and in many cases in liquid form.

These changes, together with obsolescence, required substantial improvements, modifications and replacements at the refinery. Some \$17,000,000 has

been spent in this fashion since the war and more is to come, all financed, ultimately, by the plantation owners in Hawaii.

Fortunately, competitive considerations have been laid aside by the elements of the domestic sugar industry since the war insofar as their position on legislation is concerned. Beginning in 1946, and on every occasion since when amendment or extension of the Sugar Act has been under consideration in Congress, most elements of the industry have joined with the agencies of the government concerned to develop proposals that have won approval. Without this philosophy of patient compromise by all parties the legislative picture could become a shambles.

SUGAR ACT IMPROVED

The 10-year period has, in fact, seen improvement in the Sugar Act. There have been clarification of definitions and, most important, recognition of the right of domestic growers to participate in the increased consumption of the U. S. market as a result of population growth. It is to be hoped that as inflation continues in the face of a general softening of agricultural prices, administration of the Act will also reflect adequate recognition of the industry's growing cost problems.

Capital expenditures in the industry following 1946 have totaled \$114,000,000. While some of this money went into rehabilitation and replacement of war-worn facilities, the great bulk of it went into mechanization. That the industry was able to obtain these sums through borrowings and from accumulated earnings without resort to equity financing is significant. Significant, first, because it reflects an industry tradition of lifting itself by its own bootstraps, but significant also in that returns have been so low that, except for a few companies with a history of more favorable earnings, equity financing would have been hard to obtain had we sought it.

No one can forecast what further savings may be possible through improvements in methods and machines. It would appear, however, that achievements in the immediate future will not result in changes as drastic and dramatic as those recorded in the 10-year period immediately past. This suggests that investments for purposes of mechanization are tending to level off and financial requirements will not be proportionately as large as they have been recently.

All indications point to continuation of intense competition for sugar sales in Hawaii's market area. At the same time there seems to be no basis for assuming that government administration of the sugar price will be any more responsive to rising costs than it has been in the past.

NEED FOR UNDERSTANDING

What then, in view of all these problems, can be done to keep the sugar industry successfully in business? Locally, there appears to be opportunity for further technological accomplishment. Higher yielding cane varieties must be—and probably will be—developed. Methods must be devised to reduce cane juice losses that now result from mechanical harvesting. Careful and critical analysis of methods and procedures will probably reveal further opportunities for savings. The by-products research program has already uncovered some encouraging possibilities for future use of bagasse. This research deserves continuing interest and support at both the local and national levels.

But it takes time to explore and develop these possibilities and to convert the study and research into productive business activity. A favorable business climate is also essential. It will be possible to move more quickly and effectively toward the solution of these problems if there is a constructive interest and understanding on the part of employees, their union, legislators and the public at large. To obtain such understanding seems to be the primary challenge to the industry in the future.

